DALHOUSIE UNIVERSITY

Department of Economics
ECON 5575
Econometrics I
Fall 2019

Instructor: Yulia Kotlyarova yulia.kotlyarova@dal.ca 6220 University Ave, C32
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Lectures: Tuesday and Thursday 13:05 – 14:25 MCCAIN 2184

Office hours: Tuesday 16:30 – 18:00 or by appointment

Course Description

This course is designed to introduce students to commonly used econometric concepts and methods in economic research. We will examine both the classical linear regression model and linear models under more general assumptions (heteroscedasticity, autocorrelation, multicollinearity), with a focus on estimation, inference, and forecasting. The course also provides an introduction to asymptotic theory and maximum likelihood approach.

Course Objectives/Learning Outcomes

This course introduces statistical tools for the analysis of economic and financial data. The students registered for the course are expected to have good knowledge of matrix algebra, calculus, probability theory, and statistics.

The students will learn how to

- formulate and discuss the multiple linear regression model and its underlying assumptions;
- derive the Ordinary Least Squares estimators and analyze their statistical properties;
- conduct hypothesis testing of economic questions based on estimates from regression models;
- determine the consequences of multicollinearity, omitted variables, functional form misspecification, autocorrelation and heteroskedasticity in multiple regression models;
- evaluate the adequacy of the estimated regression models by performing specification tests;
- work with generalized least squares;
- derive and apply maximum likelihood estimation and corresponding specification tests.

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Course Materials

Required textbook: R. Davidson and J. MacKinnon (2004) "Econometric Theory and Methods", Oxford University Press

Additional reading materials will be distributed in class or posted on Brightspace.

Other useful textbooks:

Greene, W. H. (2012) "Econometric Analysis", Pearson, 7th ed

Heij, C., P. de Boer, P. H. Franses, T. Kloek, H. K. van Dijk (2004) "Econometric Methods with Applications in Business and Economics", Oxford University Press (on reserve in Killam library; available online for DAL users)

Spanos, A. (1999) "Probability theory and statistical inference: econometric modeling with observational data", Cambridge University Press (available online for DAL users)

Wooldridge, J. M. (2010) "Econometric Analysis of Cross Section and Panel Data", MIT Press (an earlier edition is on reserve in Killam library)

Software: statistical packages STATA and R (open source). STATA is available in McCain labs (rooms 2018, 2019, 2020, 2022, 2104), Economics labs, and ROWE 3080. Individual student licenses for STATA IC can be purchased through STATA GradPlan http://www.stata.com/order/new/edu/gradplans/student-pricing/

Course Assessment

Component	Weight (% of final grade)	Date
Midterm	30%	22 October 2019, in class
Final exam	45%	to be scheduled by Registrar
4 assignments	25%	to be determined

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Faculty of Graduate Studies Scale:

A+ (90-100) **A** (85-89) **A-** (80-84) **B+** (77-79) **B** (73-76) **B-** (70-72) **F** (<70)

Course Policies

There will be no make-up midterm exam. If students miss the midterm for health reasons, they must inform the instructor by email on the day of the exam (or earlier). Their final exam will count for 75% of the final grade.

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If a student cannot submit an assignment on time for a valid reason, the student must contact the instructor prior to the assignment deadline to discuss alternative arrangements.

The students are not allowed to collaborate on the assignments. The full text of Dalhousie's *Policy on Intellectual Honesty* and *Faculty Discipline Procedures* is available here:

http://www.dal.ca/dept/university_secretariat/academic-integrity/academic-policies.html

Course Content

Weeks 1, 2	Probability theory and elements of asymptotic theory (DM Ch. 1, Heij Ch. 1, 2)
Weeks 3, 4	Classical linear regression model: geometry of ordinary least squares (DM Ch. 2)
Weeks 5, 6	Statistical properties of OLS (DM Ch. 3, Heij Ch. 3)
Weeks 7 - 9	Hypothesis testing in linear regression models (DM Ch. 4, 5, Heij Ch. 3)
Week 10	Generalized least squares (DM Ch. 7, Heij Ch. 5)
Week 11	Nonlinear regression (DM Ch. 6), maximum likelihood estimation (DM Ch. 10, Heij Ch. 4)
Week 12	Review sessions

Please read the University Policies and Statements on the course website (Brightspace, folder "Course Syllabus").